

## REMARKS

Elected and Withdrawn Claims

As to the formalities, while the undersigned does not entirely agree with the Examiner's identification of claims to be examined, it appears to be best practice to proceed with the generous and careful set which is examined. There will be no traverse, although it may transpire after the application is fully settled, that at least some of the withdrawn claims should be included. The objective at this time is to move this application along, because the examined claims are indeed the most important ones. The non-elected claims have been cancelled without prejudice, subject to the right to present them in a later divisional application.

Drawing Objections

The objections to the drawings are separately attended to by amendments to the specification and by changes to the drawings. The Examiner is requested to approve the proposed changes, which are shown in red on attached copies. Replacement sheets are also enclosed.

Cryptographic Errors

The objections to a plethora of alleged mis-spelled words is noted. It is reasonable for the Examiner to conclude that what she sees on her terminal is what was filed. In a purely electronic mode from applicant to Examiner, that could be



correct. However, as the Office tries to go all-electronic, conservative practitioners still file paper applications which must be scanned. The undersigned is one such practitioner.

The computers in this attorney's office are used primarily as word processors- essentially more useful typewriters (although some mechanical typewriters are still used in this office every day). The application produced by these instruments was signed by the applicant, written and reviewed by the undersigned, and filed with an Express Mail certificate by the undersigned.

None of the cited errors exists in the application as filed. A copy of the application as filed (which bears the Express Mail certificate) is enclosed. Perhaps it should be substituted for what exists in the Office system (or try to scan it again). The undersigned certifies that it is a true copy.

This should attend to the objections to the specification. The Examiner is thanked for her attending to this application as she has understood it. It is a much-appreciated courtesy.

35 USC 112, Second Paragraph

The Examiner's suggested amendments to claim 20 lines 17-26 have been made with thanks for the very helpful suggestions. A sole practitioner for many decades knows and appreciates how helpful a second pair of eyes can be, especially when accompanied by a spirit of cooperation. One word (simultaneous) was not used, as discussed below.



Rejections Under USC 102

All of the claims are basically rejected on the applicant's own US patent No. 5,967,700 (the '700 patent). This patent represents applicant's earliest efforts and awareness in this field. The field of the invention- in-situ pilings- existed, and was widely pursued long before 1995, when he filed the application that resulted in the '700 patent.

For whatever reason, the potential importance of in-situ pilings if they were made correctly, appealed to him. His early observations led him to question whether either of the two known in-situ processes (dry method and wet method), even though widely accepted, would necessarily produce a reliable reproducible in-situ piling with known properties throughout. His conclusion was that maybe they sometimes did and almost certainly there would be many times when it did not. His further efforts have created the instant and other improvements in this field.

Claims 2-9, 11-19, and 25 have been cancelled.

There remain in this application claims 1,10, 20-24 and 26-29. Claim 1 as now amended includes the limitations of claims 2 and 8. Claim 8 was allowed. Therefore claim 1 is now allowable.

Claim 10 as amended includes the limitations of allowed claim 14. It is therefore allowable.

The two allowed claims (1 and 10 as amended from claims 8 and 14) are apparatus claims. Claims 20-24 and 26-29 are method



claims which remain to be examined.

#### Section 102 and 103 Rejections

The remaining claims in issue, exemplified by claim 20, are method claims which define a process for making an in-situ piling that repeatably and reliably produces columns with known properties from top to bottom- preferably uniform properties. The pertinent properties are derived from a properly proportioned mix of aggregate, binder and water, appropriately present at the time when the mixture is to cure. The term used herein is "temporal", meaning that they all have to be there when the mix is first created.

While this would seem to be a simple enough concept, the fact is that for many years it has not been recognized or provided for. With the wet method, overlooking its many disadvantages, it does pump into the bore a fluid water/cement grout which will cure (forgetting the dilution with existing water, of course).

With the dry method, maybe some parts of the column will never cure. Dry cement in dry ground does not make a good piling. It is not uncommon for a bore to be very wet near the bottom and very dry near the top. Without sufficient water, an inferior piling will result.

The basic reference, Gunther '700 is an effort to overcome these problems. In this patent, the patentee (the applicant herein), injects water into the bore on the way down, and binder



on the way up.

This objective is and was to provide a pre-conditioned column of aggregate and water into which binder (cement/lime) would be injected on the way up to form a good uniform piling. Very often it did and does do exactly that. This would seem to be a full solution to the general problem. Experience has taught otherwise.

In many soils the drainage is very slow. In these soils, once the water is supplied the concentration of water at all depths does not radically change within the period time which it takes to make the piling. It is not unusual for it to require five to six minutes to make the pilings. In heavy soils the water does not drain rapidly. In sandy soils it draws quickly, and there is a latent uncertainty. In between soils involve varying intensity of this problem.

The proper objective is for the water and the binder when injected to meet RIGHT THEN in-situ in appropriate proportions at the various depths, but still to have been separately supplied until injected, thereby enjoying all of the potential benefits of both the wet and the dry methods, without their disadvantages. As claimed in claim 20 and its dependent claims, this a TEMPORAL matter.

This is to say that within a short time which might be simultaneous or delayed, the separately supplied components meet



each other then and there where they are mixed in a correct ratio.

There are several ways to do this, but the variety is limited because of the environments in which the pilings are formed. The machinery for this purpose is costly, and must be useful wherever the jobs come up. Reggedness, simplicity, and versatility are critical requirements for such equipment.

In the real world, injection of the two separate streams from a central shaft is ideal. Combination of the two streams inside the shaft is undesirable. For these reasons, this invention proposes that the separate streams of binder and water should either intersect directly outside of the shaft, or be injected into the shaft in such a way that the tool will combine them in-situ in a temporally suitable (short) period of time.

This can be done by injecting the two streams at different axial locations, while moving the tool (and shaft) at such a rate that within the agreed time the tool will mix them as they move along. Other ways are to inject them in converging streams which mix individually in the formation. Both are temporally suitable. Notice that this concept overcomes the limitation of the '700 patent. Injection of the binder is NOT DELAYED relative to preparation of the column while the water is added. Instead, the binder and water are supplied right then in place, and this can be done going down, going up, or both.



In the first paragraph on page 11 of the recent Office action, the Examiner states in comments about the '700 patent as follows:

At some times during axial movement of said tool (15), discharging water or dry binder from a respective injector (43,44,45, or 60) into said soil formation (12) along a respective axis of emission of water or of said binder, said axes of emission being directed away from said tool (15) into said formation (12) at a respective location along said central axis (21), so that the material of their emissions will during a limited number of revolutions of said shaft (20) encounter one another, there to be mixed as a pre-determined ratio of water and of binder, said water including water emitted from the water injector and water which may have already been present at that depth.

Here, with respect, it would appear that '700 is considered in light of this instant application. Nothing is said in the '700 patent about providing in the bore itself what is a pre-mix of water and binder at respective depths. In the '700 patent it is all to put the water in, and then to add the cement. There is no reference to limited numbers of revolutions or anything related to time.



In fact, the number of revolutions is applicable only to this instant application, because the distance the tool travels axially is a function of the number of revolutions. Then the amounts of binder (and their location in the bore) and the water are known. The accurate mixture occurs outside of the tool, in the bore. The cement may arrive a few moments after the binder, but the lapse of time is not significant.

As to the number of revolutions they relate to the concurrence of binder and water injections. In the '700 patent this is not intended. Instead the water is injected, and then the cement added is at a significantly later time with no reference to timeliness at any particular depth.

The Examiner's valued suggestions for this claim have been adopted with thanks, except that the word "simultaneous" for emission of water and binder has not been used. Almost all of the time it will be simultaneous, but when the nozzles for water and binder are perhaps 6 inches axially apart, and maybe 180 degrees around, it can occasionally be the situation where for a specific station in the piling the water which it receives and the binder which it receives, will involve a short delay. This is not simultaneous, but it is temporal. It all occurs within such a short time that the water cannot drain away too soon.

In the embodiments where the jets meet in the bore, they will be simultaneous. However where the water and binder nozzles are



axially spaced, short time gap will exist, but is acceptable. It is submitted that claim 20 as amended attends to this problem.

The Examiner's comments on page 19 of the Office action are quite pertinent and very much appreciated. The comments relate to six proportioned absences of significant limitations from the independent claims. Because of the claim amendments relating to allowable claims 8 and 14 (now claims 1 and 10) it appears that only claim 20 is involved. Claim 20 has been extensively amended, not only to include most of the Examiner's suggestions, but to assure that her comments on page 19 have been attended to.

The above discussion is believed to attend to the '700 reference.

All other method claims depend from claim 20 and derive their patentability from it. They are not separately argued.

In the course of other recent transactions the applicant and the undersigned have become aware of a number of other patents which should be shown to the Examiner. Along with these the fee for an IDS accompanies this amendment. To assure its acceptance the fee is enclosed, although the sources and recencies are such as to question the necessity for it.

The Examiner's especial attention is called to European patent No. 0 411 560, to Botto (sometimes called Trevi). The quality of the copy is poor, but is the best available.

Attention is called to Botto's (Trevi's) column 4 lines 13-



32. He fails to show the temporal mixing of binder and water, as discussed regarding the '700 patent.

Even more significantly as to Botto, it is emphasized that his is basically a dry method. He provides water only in order to drill through hard layers. Please notice his statement at his column 4 lines 14-17:

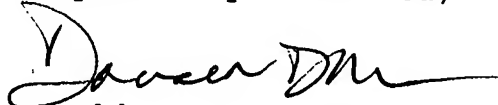
...water is sent through the tube 29 and the duct 12 only (emphasis mind - DDM) when dry or very hard layers which prevent the normal advancement of the tool, are encountered"...

Once past them, no more water is added. The amount of cement he adds is limited to what would be hydrolyzed (humidified?) by water already present. There is no showing or suggestion of coordinating the supply of water and cement in selected amounts. Botto's use of water has nothing to do with stoichiometry

The Hockey patent reference is mooted because of the reliance on claim 20 for patentability. It is fair to comment that Hocking has nothing to do with pilings.

Reconsideration of this application, allowance of the claims and passage to allowance are respectfully solicited.

Respectfully submitted,



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ANNOTATED MARKED-UP DRAWINGS

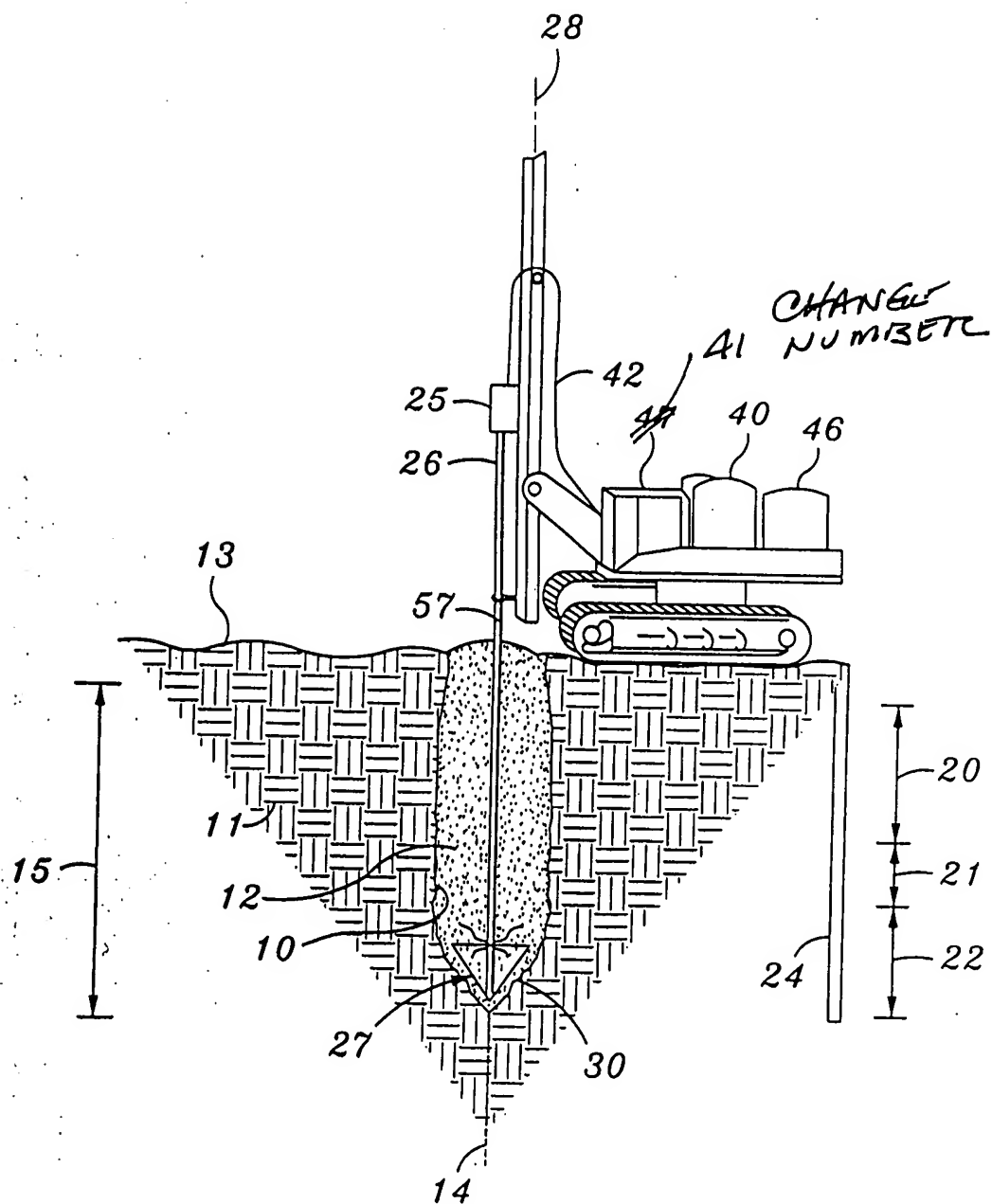
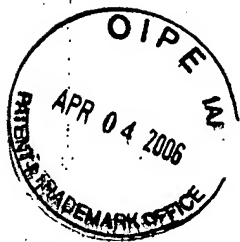


FIG. 1



# ANNOTATED MARKED-UP DRAWINGS

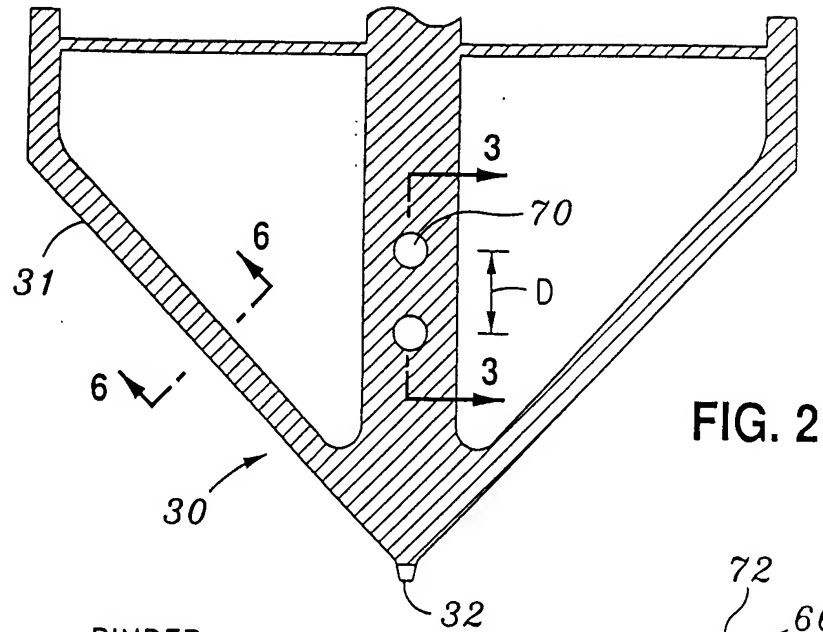


FIG. 2

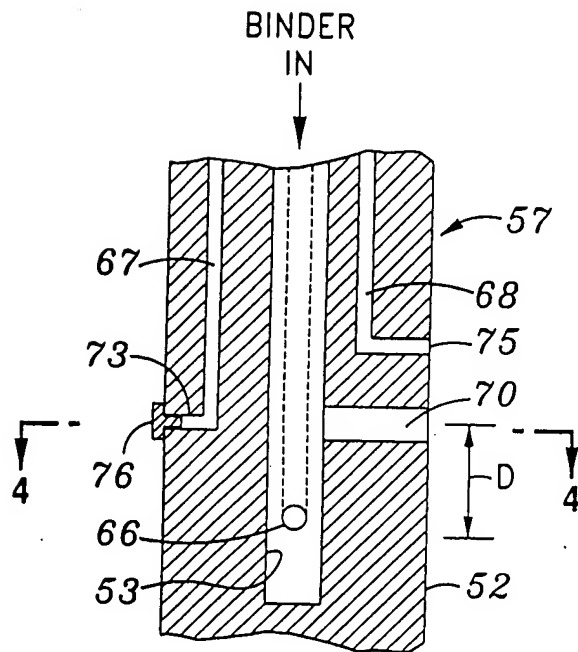


FIG. 3

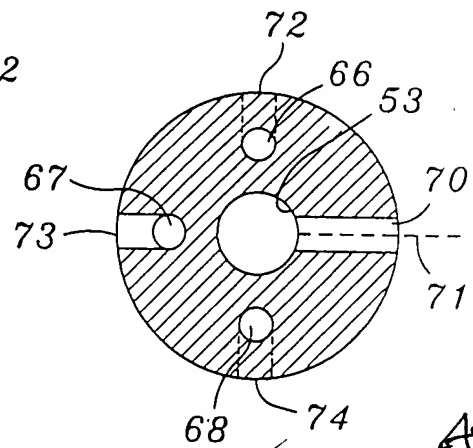


FIG. 4

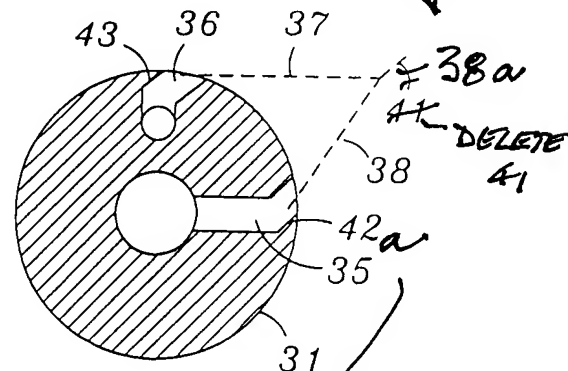


FIG. 5

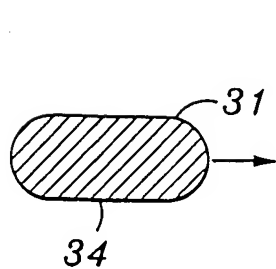


FIG. 6

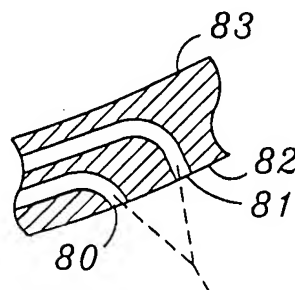


FIG. 7



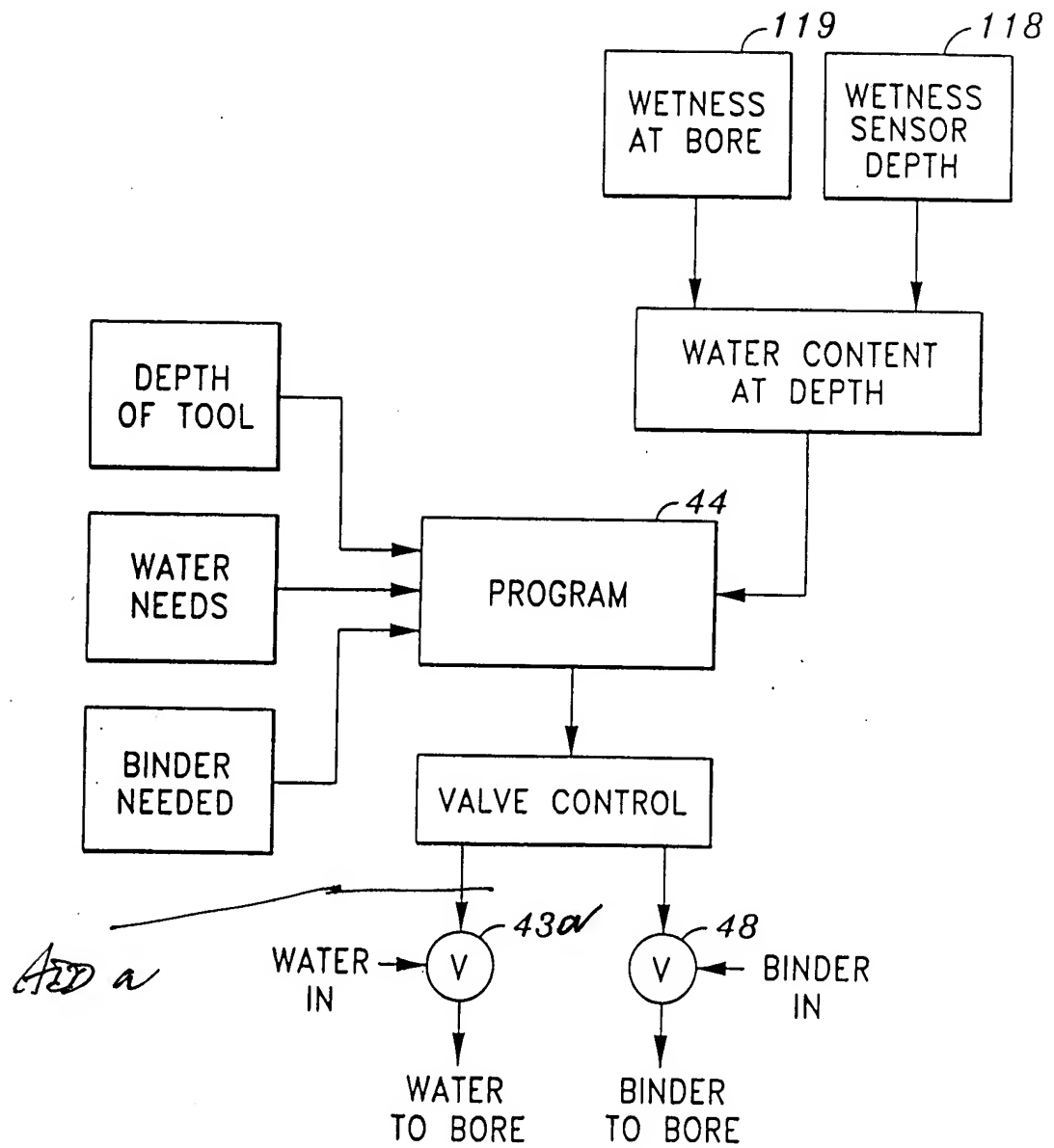


FIG. 8